Level II Instructions

Level II Monitoring Equipment and Materials

Volunteers Provide:

- Access to a boat and place to launch it.
- A life jacket.
- A secure place to store monitoring equipment.
- Approximately one hour every other Sunday or Monday from May - October.
- A pencil (pens don't work well on the "rite-in-the-rain" datasheets) and a hard surface to write on (e.g., a clipboard or notebook).

King County Provides:

- Training
- Datasheets
- Sample Bottles
- Van Dorn sampler with thermometer
- Secchi disk

Level II Monitoring Procedures

The following instructions are provided to ensure that all Level II monitors collect data in the same manner. Please read these instructions thoroughly. Proper data collection and entry will help to eliminate discrepancies and ambiguities in your data and will also lead to simplified data entry and analysis. Furthermore, if all volunteers collect and record data according to these protocols, data from different lakes can easily be compared and contrasted.

Sampling Schedule

From May through October, Level II Monitors collect water samples and record measurements every other week, except for two, 3-week intervals in mid summer; these longer breaks accommodate vacation and holiday schedules and come at a time of year when peak values are unlikely to occur.

At the beginning of the season, you will be asked to choose to sample on Sundays or Mondays. Sampling according the predetermined schedule is necessary to reduce lab costs by analyzing large batches of samples.

View the sampling schedule for the Current year

Other important notes about the sampling schedule:

- Collect samples at roughly the same time each sampling day, if possible.
- Always leave water samples on ice at the pre-designated pick-up location.
- Staff will collect samples and field sheets and deliver new sample bottles to you the day after you sample.

If you would like to switch sampling days, notify program staff before Monday morning at 8am. If you are unavailable to sample on either scheduled day, please make arrangements with a back-up monitor and notify program staff of the change by Monday at 8am, sooner if possible.

Fill out identifying information on your datasheet

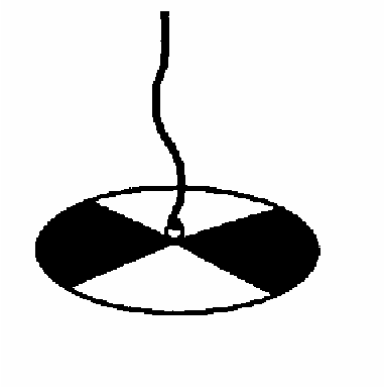
Ensure your name and a contact number are on the datasheet.

Important: If you know ahead of time that you'll miss a sampling date, notify Lake Stewardship Program staff to arrange for a back-up, if available.

Record Initial Data

The most important thing to remember is to be consistent in how samples are collected, measurements are taken and data is recorded. Whenever possible, conduct your biweekly sample collection and measurements at the same time of day.

1. Place sampling gear, anchor, and life jacket in the boat. Go to the sampling station and anchor the boat. (See Sampling Location.)
2. Use a #2 pencil (remember: no pens!) to record data on the weather proof data sheet. Fill out the sheet for Name, Phone, Date, and Time. Under "Time," enter the time the data was measured and the water samples were taken using a 24-hour time format (6:00 a.m. = 0600, Noon = 1200, 6:00 p.m. = 1800, and Midnight = 2400).
3. Write down the weather conditions, number of particles and the optional bird count. Also indicate the total number of boats on the lake, including your own.
4. If for some reason you are unable to collect water samples and take measurements, please notify a Lake Stewardship Program staff member at least two days in advance so we can avoid making an unnecessary trip to your lake to pick up your samples. If possible, try to arrange for a substitute whenever you are going to be away for an extended period of time.



Measure Secchi Depth

1. On sunny days, work on the shady side of the boat to eliminate glare.
2. If you are wearing sunglasses, remove them before you begin making your measurements.
3. The Secchi disk line is marked in 0.1 or 0.25 meter increments. Lower the Secchi disk into the water. Continue lowering the disk into the water until the disk is no longer visible.
4. Place your finger on the line at the water's surface to mark that point.
5. Raise the disk until it becomes visible again. Mark this spot on the line with your other hand.
6. Record the midpoint between these two measurements as the Secchi depth, estimating your value to the nearest 0.1 meter.

Did You Know…

The water in Crater Lake, Oregon, is so clear that a standard sized Secchi disk cannot be used to measure water clarity. It disappears as it is lowered through the water due to its size instead of water color or cloudiness masking visibility. The National Park Service has created a special disk with a diameter of one meter to use for measuring water transparency in Crater Lake. They routinely get measurements of over 100 feet!

Observe Algae and Particles

Each time you venture onto the lake to collect a sample and/or measure physical attributes, record the density of algae and particles you see in the water at your sampling site. Use the following guidelines when making your observations of algae and particles density and distribution.

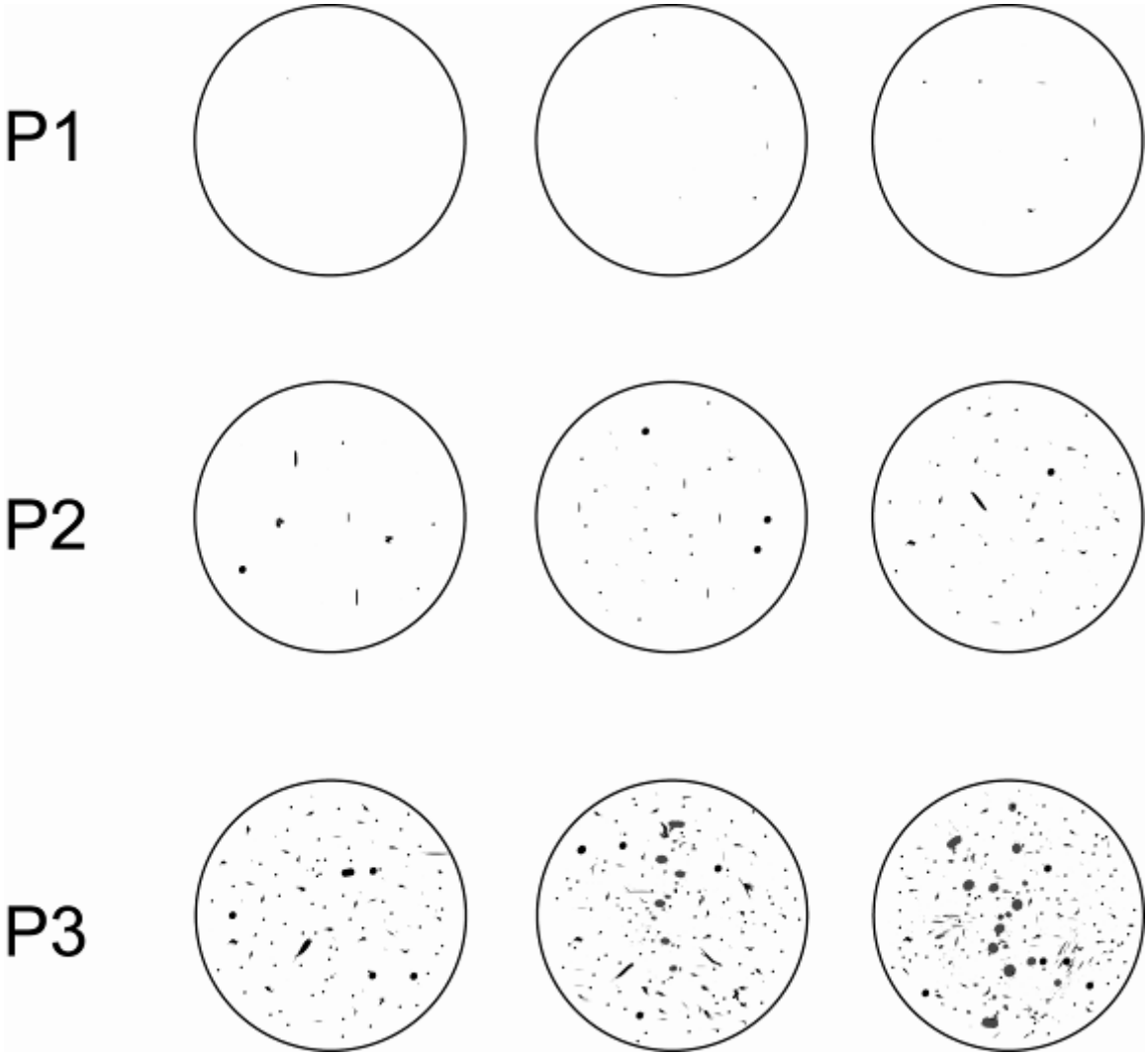
Categorizing Visible Particles

Algae in the water can appear as nebulous clouds or as small floating particles, depending on the species. Please do not count particles smaller than the period at the end of this sentence. Lower the Secchi disk to a depth of about five inches below the surface, at which depth the volume of water above the white portions of the disk will be approximately two liters. Count the number of particles in the water above the white portions of the disk, and use that number of particles to determine the rating. Alternately, you can pour two liters of water into a clean white bucket to make the assessment. Use the chart on the following page as a guide in making your observations.

Algae and Particle Classification Chart

Rating	Description	Count in ~2liters of water
P1	Few algae particles visible above disk	0-10
P2	Moderate numbers of particles	10 - 100
P3	A lot off algae – bloom conditions	>100

Imagine looking into a white bucket with two liters of water from above.



Rinse the Sample Bottles

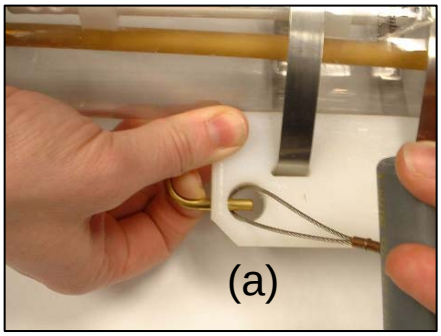
1. Rinse all bottles before collecting samples.

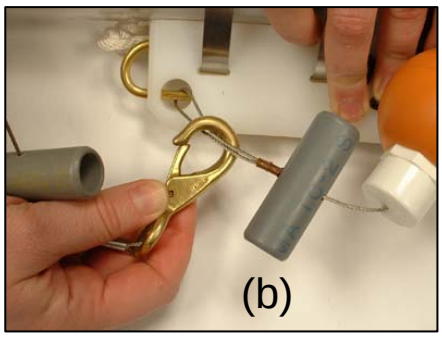
2. To thoroughly rinse a bottle, remove the top, dip the bottle into the lake to fill the bottle approximately 1/4 full, swirl the water around the bottle to cover all surfaces, and pour the water back into the lake.

3. Repeat this three times for each bottle. On the third rinse, use the water to rinse the cap of the bottle.

4. Replace the cap and leave it on until just before you fill it with the sample.

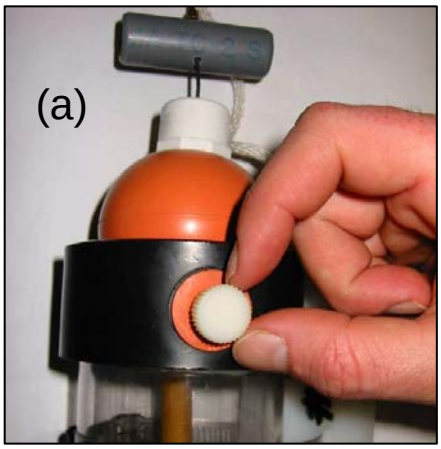
5. If there is any material visible on or near the water surface, such as pollen or algae, rinse the Van Dorn sampler first (as described in the following paragraph), and then use water from your first sampler drop to rinse the bottles one more time.

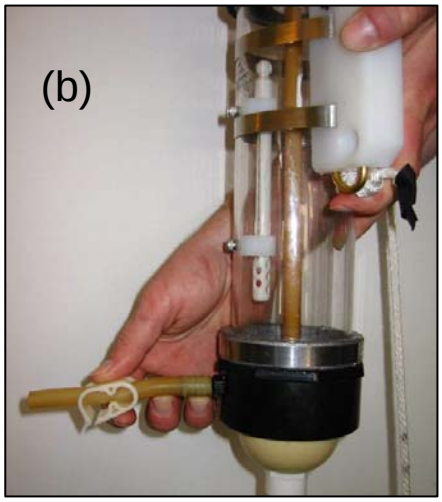




Rinse the Van Dorn Sampler

1. While sitting, rest sampler across your knees so you can see the thermometer inside.
2. With one hand, pull the rubber ball with loop only (no clip attached) out of the tube and hold tightly. With the other hand pull the brass rod and insert the cable loop (see photo “a”) into the hole located near the bottom of the large white closing mechanism. Release the rod to hook the loop.
3. Then pull the bottom ball toward the top ball and hook the clip around the entire cable loop (include both wires) from the top ball (see photo “b”). The sampler is now set.
4. Open the small plastic clamp on the drain tube near the bottom of the sampling chamber. Ensure that the clamp is not about to fall off the end of the drain tube.
5. To rinse the sampler, set the sampler as described above. Keep the messenger with you on the boat and lower the sampler to a depth of about one-meter. Gently raise and lower the sampler several times so that water passes through the open chamber of the sampler to rinse it. Do not drop the brass messenger.
6. Raise the sampler to the boat, letting all the water drain out, close the drain tube clamp.
7. You are now ready to collect your samples.





Collect Water Samples

1. To obtain a sample at one-meter depth, hold the brass messenger and gently lower the sampler vertically into the lake so that the one-meter mark is just visible at the water surface. Release the messenger to activate closure of the sampler.
2. Bring sampler to boat and hold vertically. If there is a small white round valve (see photo "a") on top of the sampler, turn it to relieve pressure, then open the clip (see photo "b") on the surgical tubing to empty the water from inside the cylinder. Direct the water from the tube into the sample bottles, filling the bottles to the neck. You will need to fill the sampler at least twice to fill all the bottles.
3. Before emptying water from the second sampler drop, let the water sit for about one minute and read the water temperature from the thermometer located inside the sampler and record it on the field sheet (__°C @1m to the nearest 0.5°).
4. Reset the sampler and collect water at a depth of one-meter until you have filled each of the bottles. Twice should suffice unless you have extra bottles to fill.
5. Place samples immediately in a cooler filled with ice. If you cannot fit a cooler into your boat, return home and place the samples in a cooler filled with ice as soon as possible or in the refrigerator overnight until setting them out for pickup the following day.

Note: If the sampler breaks while you are using it, collect the remaining samples by dipping bottles into the lake.

See the journey of Level II water samples from collection to reporting.

2002 Level II Monitoring Data Sheet

Volunteer Monitor: _____ **Phone:** _____

Sample Collected: _____ (Date) at _____ (Time-*24hr time*) **Lake:** _____

TEMPERATURE

30 20 10 0 -10 -20

At one meter: _____°C (to the nearest 0.5°C)

Profile Sample Event:

at ____m depth: _____°C (mid depth)

at ____m depth: _____°C (near-bottom depth)

SECCHI DEPTH

Secchi Depth: _____ m (to nearest 0.25m)

Notes: _____

WEATHER

- ❒ Sunny
- ❒ Partly cloudy
- ❒ Overcast
- ❒ Dark clouds
- ❒ Raining
- ❒ No wind (glassy water)
- ❒ Slight wind (small ripples)
- ❒ Breezy (small wavelets)
- ❒ Stormy (waves/whitecaps)

Rain last 24hr (mm):____

ALGAE AND AQUATIC PLANTS

	Algae	Plants
Along shoreline:	_____	_____
At your sampling location:	_____	_____

Notes: _____

BIRDS

Total number of birds present:

	Launch site	Sample site
Canada geese	_____	_____
Domestic geese	_____	_____

LAKE USE

Number of boats on lake: _____

Notes: _____

KING COUNTY

Sample at One Meter

Mid-depth Sample (or Duplicate)

Near-bottom Sample

Please provide any other information on the back of this sheet. THANKS!!!

Questions?
Call Michael Murphy
(206) 296-8008

Rev 3/19/02 \FORMS\LEVEL 2

Storing Monitoring Equipment and Sample Pick-up

1. To store the sampler, wedge the clip under the ball so air can circulate inside the sampler to dry it before your next trip. (For additional information about equipment maintenance and repair, please see Appendix B
2. The next morning, if your samples have been stored in the refrigerator transfer them to a cooler filled with ice. Be sure to check the ice level in your cooler and replenish it if necessary. Then, place the cooler and your data sheet at your designated pick-up location.
3. The samples will be picked up by staff and new bottles left for the next sampling date.
4. If you miss a sample date, return the empty bottles and blank data sheet with your next samples. Staff will drop off or mail new bottles to you prior to the next sampling date.

Quality Assurance

The quality of the data collected through the Volunteer Monitor program depends on adhering to the standard collection methods provided in this manual. Follow the instructions below to ensure the quality of the data.

1. Sample at the same location and anchor your boat to prevent drifting.
2. Fill out the data sheet completely and note unusual observations or conditions.
3. Double check the labels on the sample bottles to make sure they have the correct lake name, date, and sample depth. Make sure the date and day you collected samples are included on your data sheet. **Important**: If you sample on a different date than listed on the labels of the bottles, change the date on the labels to reflect your actual sample collection date.
4. Sample the same way and generally at the same time (between 2 p.m. and 5 p.m. if possible).
5. Rinse the sampler completely before you begin.
6. Rinse the plastic sample bottles three times before filling with water for proper analysis.
7. Keep your fingers out of the sampling equipment and bottles and hold the bottle caps by their edges only.
8. Sample at one-meter depth unless otherwise instructed.
9. Fill bottles to the neck only (not full to the top) and cap tightly.
10. Store your samples in an ice chest or refrigerator until pick-up.
11. Call Lake Stewardship Program staff when you cannot sample. Tell us if you have arranged to have a back-up monitor collect samples when you are unavailable. Lake Stewardship Program staff are available to train back-up monitors upon request.

All samples are picked up by program Staff and delivered to the King County Environmental Laboratory in Seattle. Samples should be preserved and/or analyzed within 24-48 hours; otherwise the analysis results are unreliable.

Laboratory staff adhere to additional quality assurance procedures for water samples, including logging samples, reviewing data sheets, verifying lab work orders, and distributing the samples for analysis. Laboratory staff also track samples, analyze data, and report final results. To provide quality assurance, the lab will "split" some samples in two and analyze the samples separately to measure the variability associated with the lab analysis.

Profile Sampling

Standard sampling methods should be followed during all sampling sessions. On two occasions during the season, once in May and again in late August, you may be asked to collect lake profile samples from one or two additional depths – mid-lake depth and near-bottom – depending on the total depth of your lake. Read the labels on the bottles to determine the sample depths for your lake.